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1 1. A method of establishing communications, the  
2 method comprising:  
3 automatically provisioning a primary circuit for  
4 communications between a first node and a second node in a  
5 communications network; and  
6 automatically provisioning a protection circuit for  
7 communications between the first node and the second node.

1 2. The method of claim 1 wherein a sum of  
2 administrative weights of all links forming the primary and  
3 protection circuits is minimized with respect to available  
4 links.

1 3. The method of claim 2 wherein the primary and  
2 protection circuits are provisioned in response to receiving  
3 a request to establish communications between the first and  
4 second nodes.

1 4. The method of claim 2 wherein the links forming  
2 the primary and protection circuits are non-overlapping.

1 5. The method of claim 4 wherein, except for the  
2 first and second nodes, the primary and protection circuits  
3 do not share any other nodes.

1 6. The method of claim 2 including:  
2 determining a first route between the first and second  
3 nodes in the network so that a sum of original administra-  
4 tive weights associated with links along the first route is  
5 minimized with respect to available links;

6 establishing an augmented network corresponding to the  
7 communications network;

8 determining a second route between the first and second  
9 nodes based on the augmented network so that a sum of  
10 administrative weights associated with links along the  
11 second route is minimized with respect to available links;  
12 and

13 combining the first and second routes to obtain first  
14 and second paths between the first and second nodes, wherein  
15 the first and second paths correspond to the primary and  
16 protection circuits.

1 7. The method of claim 6 wherein augmenting the  
2 network includes:

3 assigning a new administrative weight for each link  
4 along the first route based on the original administrative  
5 weight corresponding to the same link; and

6 limiting a permissible direction of communications for  
7 each link based on a direction established for that link in  
8 the first route.

1 8. The method of claim 7 wherein each new  
2 administrative weight has a negative value and an amplitude  
3 equal to the original administrative weight for the same  
4 link.

1 9. The method of claim 6 wherein combining the first  
2 and second routes includes eliminating from consideration  
3 links included in both the first and second routes.

1        10. The method of claim 2 including using the  
2 protection circuit for communications between the first and  
3 second nodes if a failure occurs in the primary circuit.

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1        11. An article comprising a computer-readable medium  
2 including instructions for causing a computer system to:  
3 provision a primary circuit for communications between  
4 a first node and a second node in a communications network;  
5 and  
6 provision a protection circuit for communications  
7 between the first node and the second node.

1        12. The article of claim 11 wherein a sum of  
2 administrative weights of all links forming the primary and  
3 protection circuits is minimized with respect to available  
4 links.

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1        13. The article of claim 12 including instructions for  
2 provisioning the primary and protection circuits in response  
3 to a request to establish communications between the first  
4 and second nodes.

1        14. The article of claim 12 wherein the links forming  
2 the primary and protection circuits are non-overlapping.

1        15. The article of claim 14 wherein, other than the  
2 first and second nodes, the primary and protection circuits  
3 do not share any other nodes.

1        16. The article of claim 12 including instructions for  
2 causing the computer system to:

3        determine a first route between the first and second  
4 nodes in the network so that a sum of original administra-  
5 tive weights associated with links along the first route is  
6 minimized with respect to available links;

7        establish an augmented network corresponding to the  
8 communications network; and

9        determine a second route between the first and second  
10 nodes based on the augmented network so that a sum of  
11 administrative weights associated with links along the  
12 second route is minimized with respect to available links;  
13 and

14       combine the first and second routes to obtain first and  
15 second paths between the first and second nodes, wherein the  
16 first and second paths correspond to the primary and  
17 protection circuits.

1        17. The article of claim 16 wherein the instructions  
2 for causing the computer system to augment the network  
3 include instructions for causing the computer system to:

4        assign a new administrative weight for each link along  
5 the first route based on the original administrative weight  
6 corresponding to the same link; and

7        limit a permissible direction of communications for  
8 each link based on a direction established for that link in  
9 the first route.

1        18. The article of claim 17 wherein each new admin-  
2 istrative weight has a negative value and an amplitude equal  
3 to the original administrative weight for the same link.

1        19. The article of claim 16 wherein the instructions  
2 for causing the computer system to combine the first and  
3 second routes includes instructions for causing the computer  
4 system to eliminate from consideration links included in  
5 both the first and second routes.

1        20. The article of claim 12 including instructions for  
2 causing the computer system to use the protection circuit  
3 for communications between the first and second nodes if a  
4 failure occurs in the primary circuit.

1        21. A communications system comprising:  
2 a plurality of nodes;  
3 transmission facilities connecting the nodes;  
4 a database storing information regarding  
5 characteristics of the transmission facilities;  
6 memory storing instructions to:  
7        provision a primary circuit for communications  
8 between a first node and a second node in the network; and  
9        provision a protection circuit for communications  
10 between the first node and the second node; and

11 a processor for executing the instructions in response  
12 to a request to establish communications between the first  
13 and second nodes.

1 22. The system of claim 21 wherein the system  
2 comprises a plurality of protocol levels and wherein the  
3 processor can execute the instructions with respect to any  
4 of the protocol levels.

1 (23). The system of claim 21 wherein a sum of  
2 administrative weights of all transmission facilities  
3 forming the primary and protection circuits is minimized  
4 with respect to available links.

1 (24). The system of claim 23 wherein the transmission  
2 facilities forming the primary and protection circuits are  
3 non-overlapping.

1 (25). The system of claim 24 wherein, other than the  
2 first and second nodes, the primary and protection circuits  
3 do not share any other nodes.

1 26. The system of claim 23 wherein the memory includes  
2 instructions to:

3 determine a first route between the first and second  
4 nodes in the network so that a sum of original administra-  
5 tive weights associated with transmission facilities along  
6 the first route is minimized with respect to available  
7 links;

8 establish an augmented network corresponding to the  
9 communications network; and

10 determine a second route between the first and second  
11 nodes based on the augmented network so that a sum of  
12 administrative weights associated with transmission  
13 facilities along the second route is minimized with respect  
14 to available links; and

15 combine the first and second routes to obtain first and  
16 second paths between the first and second nodes, wherein the  
17 first and second paths correspond to the primary and  
18 protection circuits.

1 27. The system of claim 26 wherein the instructions  
2 augment the network include instructions to:

3 assign a new administrative weight for each  
4 transmission facility along the first route based on the  
5 original administrative weight corresponding to the same  
6 transmission facility; and

7 limit a permissible direction of communications for  
8 each transmission facility based on a direction established  
9 for that transmission facility in the first route.

1 28. The system of claim 27 wherein each new admin-  
2 istrative weight has a negative value and an amplitude equal  
3 to the original administrative weight for the same  
4 transmission facility.

1 29. The system of claim 21 wherein the instructions to  
2 combine the first and second routes includes instructions to

3 eliminate from consideration transmission facilities  
4 included in both the first and second routes.

1 30. The system of claim 23 wherein the memory includes  
2 instructions to use the protection circuit for  
3 communications between the first and second nodes if a  
4 failure occurs in the primary circuit.